

REMARKS

Claims 10-13 and 15-36 were previously pending. Claims 22 and 27 are currently amended. Support for these amendments can be found at, for example, paragraphs [0028] and [0029] and FIGS. 1 and 2 of the application as published (U.S. Patent Application Pub. No. 2006/0000774 A1). No claims are currently added or canceled. As a result, claims 10-13 and 15-36 are pending for examination with claims 10, 20, 22, and 27 being independent claims. No new matter has been added.

Rejections Under 35 U.S.C. § 103

Claims 10-13, 15-21, and 35 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Horii, JP 10076264A (hereinafter “Horii”) in view of Cote et al., U.S. Patent No. 5,607,593 (hereinafter “Cote”) and further in view of Ide, JP 2277528 (hereinafter “Ide”).

No *prima facie* case of obviousness of claims 10-13, 15-21, and 35 over Horii in view of Cote and further in view of Ide can be made. The asserted combination of Horii with Cote and Ide cannot disclose or suggest each and every element of claims 10-13, 15-21, and 35. Further, Horii, Cote, and Ide could not have been validly combined *ab initio*.

There is no aeration hood as recited in any of claims 10-13, 15-21, and 35 disclosed in any of Horii, Cote, or Ide. None of Horii, Cote, or Ide contemplate or appreciate the benefit of an aeration hood which functions according to the claimed embodiments of the present invention. None of Horii, Cote, or Ide contemplate or disclose any structure within a feed tank surrounding one or more filtration modules comprising membrane modules disposed within tubes or sleeves which would permit a liquid level of a feed liquid enclosed therein to be lowered by introducing a gas into the structure. In fact, as is discussed below, inclusion of such a structure in the filtration device of Horii would be counter to the operating principles and objectives of this device.

* The apparatus of Horii appears to function in a similar manner as that of the Miyashita reference cited in the previous Office Action, mailed February 19, 2009. As such, the arguments presented in the previous response of April 13, 2009 as to why the claims of the present invention are patentable over Miyashita, Cote and Ide, although not repeated in detail here, apply equally well to the present rejections over Horii, Cote, and Ide.

As such, the asserted combination of Horii, Cote, and Ide cannot disclose or suggest an aeration hood as recited in any of claims 10-13, 15-21, or 35.

Horii does not disclose, teach, or suggest an aeration hood configured and arranged such that gas fed into the aeration hood will displace feed liquid and lower a level of feed liquid in the aeration hood, as recited in independent claims 10 and 20. The header 16 disclosed in Horii cannot be an aeration hood upper wall as is asserted by the Examiner. Horii discloses that fluid flows upward through the “upflow way 4” through the header 16 and then into the “lower countercurrent way 5” and back into the “upflow way 4” again. (Horii at paragraph [0015]; FIG. 1.) Horii discloses that the header 16 includes “waterway section 18 for upflow to pass.” (Horii at paragraph [0013]; FIG. 2.) One of ordinary skill in the art, upon reading that the header 16 should include “waterway sections,” (i.e. flow passages) would not have been motivated to modify the header of Horii in light of Cote or Ide so as to not contain flow passages.

The header 16 of Horii could not be an upper wall of an aeration hood configured and arranged such that gas fed into the aeration hood will displace feed liquid and lower a level of feed liquid in the aeration hood. Any gas fed into the “upflow way 4” of Horii would escape through the “waterway section” in the header 16, and thus could not displace feed liquid from within the “upflow way 4.”

If the header 16 of Horii were somehow modified so as to form an upper wall of an aeration hood as recited in either of independent claims 10 or 20, this would render the filtration apparatus of Horii inoperable for its intended purpose. If gas fed into the “upflow way 4” (which the Examiner appears to equate with the interior of the presently recited aeration hood) would displace feed liquid and lower a level of feed liquid therein, as recited in independent claims 10 and 20 then the header 16 of the “upflow way 4” would also prevent the flow of liquid or gas therethrough. The device of Horii would then be incapable of circulating fluid from the “upflow way 4” to the “countercurrent way 5.” Any bubbles entering the alleged aeration hood would remain trapped there and prevent liquid to be filtered from reaching the membrane modules, thus rendering the filtration assembly of Horii inoperable for filtering the liquid. As such, one of ordinary skill in the art would not have been motivated to have modified Horii to include an aeration hood as recited in either of independent claims 10 or 20 or the claims that

depend from these claims. See *In re Gordon*, 733 F.2d 900, 902 (Fed. Cir. 1984) (finding no suggestion to modify a prior art device where the modification would render the device inoperable for its intended purpose.)

In addition, no combination of Horii with Cote and Ide could render obvious the sleeves or open-ended tubes recited in any of claims 10-13 or 15-36. Sheaths 5, 5a of Cote do not comprise open-ended tubes extending downwardly from the upper wall of an aeration hood as recited in independent claims 10 and 22. Cote does not disclose “open-ended tube[s] descending downwardly.” Figures 1, 3, 4, 6, 7, 8, 9, 10, and 11 of Cote clearly show sheaths joined to a wall on their bottom end, not extending downward from an upper wall. Ide does not disclose any open-ended tube or sleeve within the filtration arrangements as recited in either of independent claims 10 or 20 or the claims that depend therefrom because Ide does not disclose any open-ended tube or sleeve surrounding a membrane module and distinct from any sidewall of an aeration hood.

One of ordinary skill in the art would not have been motivated to have combined the sheaths of FIGS 9, 9A, or 9c of Cote or the protecting tube 4 of Ide with the filtration apparatus of Horii. This is because doing so would only have added to the complexity and cost of the apparatus of Horii while providing no benefit. The Examiner asserts in paragraph 6 of the Office Action that a motivation to combine the sheaths of Cote with the apparatus of Horii can be found because “Cote et al. further discloses that this arrangement is used to promote circulatory flow within the tank.” The structure of Horii, however, already provides for the circulation of fluid within the tank by introducing aerating gas from the diffuser 6 into the area including the membranes 15 formed between the outer wall of the immersion tub 1 and the bridgewalls 3 of the apparatus disclosed. (See paragraph [0015] and FIG. 1 of Horii.) To include the additional structure of the sheaths of Cote within the “upflow way 4” of Horii would increase the amount of hardware in the path of the liquid flowing through the “upflow way 4.” This would increase the flow resistance of the circulating fluid, thus increasing the amount of energy required to circulate fluid through the apparatus, a result one of ordinary skill in the art would wish to avoid.

There would have been no motivation for one of ordinary skill in the art to have combined the protecting tube 4 of Ide with the apparatus of Horii for similar reasons as

there would have been no motivation to combine the sheaths of Cote with the apparatus of Horii.

Further, one of ordinary skill in the art would not have been motivated to have combined Horii with Cote or with Ide in the manner suggested because these three references are directed to fundamentally different and discreet filtration devices, each having specific goals, structures, and methods of operation. The Examiner appears to have used hindsight reasoning as a roadmap to pick, choose, and combine various discreet elements of these three references. The Examiner has not provided a valid rationale as to why one of ordinary skill in the art would have modified Horii to include features of Cote or Ide in the manner asserted. To the contrary, one of ordinary skill in the art would have been dissuaded from modifying Horii to include features of Cote and/or Ide in the manner asserted for the reasons outlined above.

As none of Horii, Cote, or Ide disclose, teach, or suggest either an aeration hood or the sleeves or open-ended tubes recited in any of claims 10-13, 15-21, and 35, the asserted combination of Horii, Cote, and Ide cannot disclose, teach, or suggest each claim element of any of claims 10-13, 15-21, and 35. Further, one of ordinary skill in the art would not have been motivated to have combined these references *ab initio*. As such, none of claims 10-13, 15-21, and 35 could be obvious over the asserted combination of Horii, Cote, and Ide.

Independent claim 20 is further patentable over the asserted combination of Horii, Cote, and Ide for at least an additional reason (which is not addressed in the Office Action). In addition to reciting the claim elements missing from Horii, Cote, and Ide discussed above, independent claim 20 recites in pertinent part “[a] filtration arrangement comprising . . . a sleeve surrounding a periphery of . . . at least one membrane module . . . and having an open region adjacent to a lower end of the at least one membrane module[, and] an aeration hood, distinct from the sleeve [including] at least one aeration opening in a wall of the aeration hood positioned adjacent to the open region, the aeration hood constructed and arranged to direct a gas through the at least one aeration opening and into an interior of the sleeve through the open region upon displacement of the feed liquid in the aeration hood.” None of Horii, Cote, or Ide disclose or suggest any aeration hood including “at least one aeration opening in a wall of the aeration hood positioned adjacent

to [an] open region [of a sleeve surrounding a periphery of at least one membrane module], the aeration hood constructed and arranged to direct a gas through the at least one aeration opening and into an interior of the sleeve through the open region upon displacement of the feed liquid in the aeration hood.” Thus, independent claim 20, and dependent claim 21, which depends therefrom, further patentably distinguish over the asserted combination of Horii, Cote, and Ide.

Accordingly reconsideration and withdrawal of the rejection of claims 10-13, 15-21, and 35 under 35 U.S.C. § 103 as being unpatentable over Horii in view of Cote and further in view of Ide is respectfully requested.

Claims 27-34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Horii in view of Cote.

No *prima facie* case of obviousness of claims 27-34 over Horii in view of Cote can be made. The asserted combination of Horii with Cote cannot disclose or suggest each and every element of claims 27-34. Further, Horii and Cote could not have been validly combined *ab initio*.

Horii and Cote both fail to disclose any open-ended tube distinct from any side wall of an aeration hood, and having an open end sealingly secured to an upper wall of an aeration hood at an opening in the upper wall, a membrane module disposed within the tube, the tube extending part way along the length of the membrane module and defining an open region adjacent the lower end of the membrane module, the open region comprising a portion of the lower end of the membrane module extending from a lower end of the tube, the membrane module in fluid communication with the water to be treated through the opening in the upper wall, as recited in independent claim 27, as amended. As recognized by the Examiner, Horii does not disclose a membrane module mounted inside a tube with at least one aeration opening in the tube wall at the bottom. (Office Action paragraph 15). Indeed, Horii does not disclose membrane modules disposed within any open-ended tubes distinct from any side wall of an aeration hood whatsoever, let alone open-ended tubes having open ends sealingly secured to an opening in an upper wall of an aeration hood. It is the membranes 15 themselves which are secured to the header 16 of Horii, not any tube in which the membranes 15 are disposed.

Cote describes sheaths 5, 5a secured to a lower wall 9 of a filtration chamber, not to any upper wall of any aeration hood.

One of ordinary skill in the art would not have been motivated to have combined Cote with Horii in a manner that resulted in an open-ended tube distinct from any side wall of an aeration hood sealingly secured to an upper wall of an aeration hood, as recited in independent claim 27, for the reasons discussed above.

Further, Horii and Cote both fail to disclose an open-ended tube distinct from any side wall of an aeration hood and extending part way along the length of a membrane module to define an open region adjacent the lower end of the membrane module, the open region comprising a portion of the lower end of the membrane module extending from a lower end of the tube. Horii does not disclose any open-ended tube distinct from a sidewall of an aeration hood. Open-worked zone 8 of Cote is not an open region comprising a portion of the lower end of a membrane module extending from a lower end of a tube. Rather open-worked zone 8 is defined by a structure which is part of the sleeve 5a, illustrated in Cote as lines connecting portions of the sleeve 5a, which confines membrane module 14 contained therein.

As neither Hori nor Cote disclose, teach, or suggest the tubes recited in any of claims 27-34, no combination of Horii and Cote could disclose, teach, or suggest each claim element of any of claims 27-34. Further, one of ordinary skill in the art would not have been motivated to have combined these references *ab initio*. As such, none of claims 27-34 could be obvious over the asserted combination of Horii and Cote.

Accordingly reconsideration and withdrawal of the rejection of 27-34 under 35 U.S.C. § 103 as being unpatentable over Horii in view of Cote is respectfully requested.

Claims 22-26 and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Horii in view of Cote and further in view of Ide.

No *prima facie* case of obviousness of claims 22-26 and 36 over Horii in view of Cote and further in view of Ide can be made. The asserted combination of Horii with Cote and Ide cannot disclose or suggest each and every element of claims 22-26 and 36. Further, as previously discussed, Horii, Cote, and Ide could not have been validly combined *ab initio*.

As discussed above, the asserted combination of Horii, Cote, and Ide cannot disclose an “aeration hood comprising an open-ended tube distinct from any side wall of the aeration hood extending downwardly from an upper wall of the aeration hood, the open-ended tube partially enclosing the membrane module” or “a portion of a lower end of the membrane module extending from a lower end of the open-ended tube” as recited in independent claim 22, as amended. Also, as discussed above, one of ordinary skill in the art would not have been motivated to have modified the structure of the apparatus of Horii to block the flow of gas or fluid through the header 16 as this would have rendered the apparatus unable to perform its intended function. Thus, one of ordinary skill in the art would not have been motivated to have modified the apparatus of Horii such that it were capable of performing the step of “lowering a liquid level in the aeration hood by displacing feed liquid within the aeration hood with a gas” as recited in independent claim 22.

As such, the asserted combination of Horii, Cote, and Ide cannot disclose, teach, or suggest each claim element of claims 22. Further, one of ordinary skill in the art would not have been motivated to have combined these references *ab initio*. Claims 23-26 and 36 depend either directly or indirectly from independent claim 22 and are patentable over the asserted combination of Horii, Cote, and Ide for at least the same reasons. Thus, none of claims 22-26 and 36 could be obvious over the asserted combination of Horii, Cote, and Ide.

Accordingly reconsideration and withdrawal of the rejection of claims 22-26 and 36 under 35 U.S.C. § 103 as being unpatentable over Horii in view of Cote and further in view of Ide is respectfully requested.

CONCLUSION

In view of the foregoing Amendments and Remarks, this application is in condition for allowance; a notice to this effect is respectfully requested. If the Examiner believes that the application is not in condition for allowance, the Examiner is requested to call Applicant's attorney at the telephone number listed below.

If this Response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this Response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762. (Ref. No. M2019-7023US)

Respectfully submitted,
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